

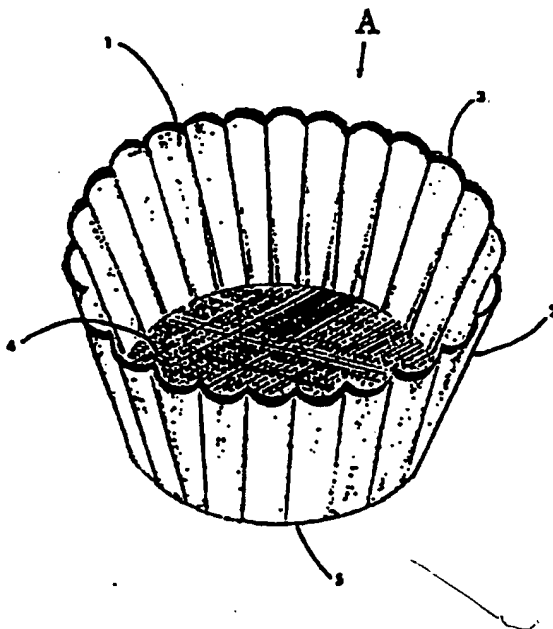


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(21) International Application Number: PCT/CA91/00065 (22) International Filing Date: 4 March 1991 (04.03.91) (30) Priority data: 2,012,891 22 March 1990 (22.03.90) CA (71)(72) Applicant and Inventor: FRISE, Raymond, J. [CA/CA]; 750 York Mills Rd., Suite 806, Don Mills, Ontario M3B 1W9 (CA). (81) Designated States: AT, AT (European patent), AU (Petty patent), BE (European patent), BF (OAPI patent), BG (Inventor's certificate), BJ (OAPI patent), BR, CA, CF (OAPI patent), CG (OAPI patent), CH, CH (European patent), CM (OAPI patent), DE, DE (Utility model), DE (European patent), DK, DK (European patent), ES, ES (European patent), FI, FR (European patent), GA (OAPI patent), GB, GB (European patent), GR (European patent), HU, IT (European patent), JP (Utility model), KP (Inventor's certificate), KR, LK, LU, LU (European patent), MC, MG, ML (OAPI patent), MR (OAPI patent), MW, NL, NL (European patent), NO, RO, SD, SE, SE (European patent), SN (OAPI patent), SU (Inventor's certificate), TD (OAPI patent), TG (OAPI patent), US.		Published <i>With international search report. Before the expiration of the time limit for amending the claims and to be republished in the event of the receipt of amendments.</i>

(54) Title: RE-USEABLE BREWING FILTER**(57) Abstract**

A re-useable coffee, tea, brewing filter (1) comprised of long-chain synthetic polymere or polyamide with the addition of polyethelene in the extrusion process, this synthetic fibre is then designed with interstices of a controlled and unformed size and weight. This filter is heat set to a fluted frustum-conical, or funnel moulded shape. This filter needs no outside support skeleton or ribs to maintain its shape, under any condition of distortion. This filter is soft and very flexible, but will automatically assume its original shape. The upper rim (3) of the filter is the only area of a solid non-porous medium, it is fused to a solid which helps maintain its strenght in maintaining its shape. The non-fluted flat area defines the bottom area (4), with the fluted walls (2) urging the remainder of the filter material toward engagement with the filter basket or support structure side wall area. Differences in size of support basket and filter will automatically be accommodated by extension or compression of interstices in a controlled uniformed manner.



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RE-USEABLE BREWING FILTER

DESCRIPTION OF INVENTION

In accordance with the present invention, there is provided a re-useable coffee, or tea brewing filter construction. This filter is comprised of a long chain synthetic polymer or polyimide, composed of at least 85% of an ester, or recurring amide groups. With a specific gravity of 1.14 to 1.38. It should be that of a high density polymere for maximum operating temperature of around 300 degrees F. Have a high resistance to acids, and alkalies, as well as oxidizing agents, and solvents. This fibre is then square weaved, for good flow rate and cake discharge. The interstice of the cross threads of the weaves for the preferred embodiment of the present for "fine" coffee granules, be .0070in , and for "medium to coarse" .0083-.0098in. The filter is then mechanically moulded into a fluted frustum conical shape. The top rim of the moulded filter is a solid non porous fused section. With a depth of approximately 1/16th - 1/8th inch, for added support during, and after any form of distortion. The filter is made only of the same fibre with no-associated structure affixed to it, or bonded to it. The filter can be moulded into any desired shape to fit in association with an associated support, or relieving structure, but the preferred embodiment is the fluted-frustum conical shape, or any shape therein. The principal object of the present invention, is the provision of a "new" improved re-useable (ecological) brewing filter construction. Another object of the present invention is the provision of such a filter construction which is flexible, but firm in its support shape, with no skeleton support structure. Which is an improvement and advantage over prior art. All prior art uses skeletal support structures, constructed from materials that are mechanically bonded to the face of the medium, making the filter non flexible and hard to clean, which is an important part of a good brewing filter. The non-volatile pigments present in "R&G" coffee, tend to penetrate the fibres of most screen type filter medium, because of the addition of a comonomer into the molecule, interfering with crystallization of the fibres. Therefore permanently staining the filter. An object of the present invention is to increase the degree of crystallinity, and the degree of orientation of the molecules, with respect to the fibres axis. Therefore pigment will, to the least degree, diffuse into the fibre matrix. The present invention therefore is very easily cleanable, and will last an extended period of time. Another object of the present invention, is the provision of a reuseable brewing filter construction, that is simple, and inexpensive to manufacture. Still another object of the present invention, is the provision of a filter construction which is readily adapted to use in a number of different enviroments, for different applications. Other advantages of the subject invention, will become readily apparent, to those skilled in the art upon a reading and understanding of the following drawings and specifications.

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The present invention may take physical form in certain parts, and arrangements of parts, preferred and alternative embodiments of which will be described in detail in the specifications, and illustrated in the accompanying drawings, which form a part hereof and wherein:

FIG.1 Is a perspective view illustrating the invention formed in accordance with the concepts of the present invention.

FIG.2 Is a perspective view showing the filter construction of fig.1 as it is being inserted into a brewing funnel of a drip type coffeemaker.

FIG.3 Is a perspective view showing an alternative shape for a different funnel basket shape of another drip type coffeemaker.

DETAILED DESCRIPTION OF THE PREFERRED AND ALTERNATIVE EMBODIMENTS

Referring now to the drawings wherein the showings are for purposes of illustrating the preferred and alternative embodiments of the invention only, and not for the purposes of limiting same. Fig.1 shows a coffee brewing filter construction comprised of a thin, flexible filter having a fluted-frustum conical shape, with a support rim of fused material. More particularly, filter material (A) has a fluted inner face (1) a fluted outer face (2) and an outer support peripheral edge (3). In the arrangement shown, and for the purposes of utilization, in a conventional drip type coffeemaker funnel basket, edge (3) is contoured to the fluted side wall shape. Although other configurations could also be utilized to accomodate a particular filter application, filter material (A) could be comprised of any number of different materials such as polypropylene and polyvinylchloride, or a metallic mesh, or a fiborous material incorporating a resin. However in the preferred embodiment of the present invention, a particular polyethelene terephthalate fibre comprised of a square weave construction is needed. Fibres are manufactured and marketed in different types and classes, as well as different chemical compositions and processes. The porosity, permeability or interstice opening sizes of filter material (A) are selected in three sizes which will allow the desired flow of liquid through the coffee and through the filter, while preventing passage of the coffee grounds. The polyethelene terephthalate used in the preferred emodiment of the present invention can have a molecular weight of 12,000-20,000, with a preferred density of 1.40-1.45 and Tg in the range of 70-80 degrees celsius, and a moisture regain of 0.40%. This is desired, when the filter is to be employed with brewing coffeemakers in order to prevent absorbing oils from the coffee granules during extended periods of use. Any such absorption might otherwise render the coffee bitter or rancid. The flat bottom (4) of filter (A) is the main septum from hydrostatic

drip head liquid, that flow through coffee granules to server container. Extending to base of fluted side wall supports (5) and generally extending vertically to the bottom of fused peripheral edge (3) the outer peripheral edge (3) helps support a integral collapse under cake expansion, from liquid absorption in brewing process, while in the rigid supporting structure, as well as aids in automatic shape resumption. The design of the present invention, allows for the present invention to occupy a total space, in communication with the supporting structure, in that the flat bottom (4) extending to fluted side wall base (5) has no skeletal support rib to terminate expansion of septum area (4) therefore moulds itself to the full shape of the supporting brewing funnel basket, taking full advantage of each manufactureres drip head plurality arrangement for hot water flow. If coffee granule surface is reduced, the water flow will drip a large percentage of water through the side walls of a fixed sized rib supported filter, thereby reducing saturation of coffee granules, therefore reducing effective brewing and filtration of coffee granules. As shown in fig (1) there are 24 flutes on the side wall (1,2) this is to facilitate ease of bending between flute sets. Each flute is 1cm apart from the peripheral edge of the base (4) extending vertically while increasing in width, to the rim (3) of 2cm apart. With the flat bottom (4) diameter of 8cm. with a vertical inclination from 180 to 130 degrees, as 50 degree angle from fluted outer edge (2) and inner edge (1) with a free standing filter resting form, the outer peripheral edge diameter (3) of 15cm, this preferred shape allows for a wide variety of adaptation to conventional brewing funnels. But the preferred shape of the present invention, does not limit the present invention from being moulded and manufactured in different shapes and demensions to suit a particular support structure, as is shown in fig (3). The precise method of manufacture may, to some extent, be dictated by the specifics of the intended filter application. For the purpose of the present invention as a brewing filter for coffeemakers, it is particularly desired that there be no skeleton, but the composition of the fibre be that, that it will be made, so that there is no extensive rotation of large segments of the molecules below 100 degrees C. So that when moulded in the manufacturing process, if the filter is distorted from mechanical stresses and temperature stress, that the filter fibres will remember, and return to there original geometry. Thus this filter from other material compositions that tend to return to a linear geometry when heated above Tg. Also the composition of the fibre used in the present invention is soft and easily handled, but when it is heat formed into the shape of figure (1) it is fairly rigid on the outer peripheral edge (3) which helps to keep form to the filter construction. Fig(2) shows the filter construction of fig (1) as it is being inserted into a filter basket for a drip type coffeemaker. Fig (3) is another common coffee filter shape used in home drip type coffeemakers. It is more of a funnel shape with an opening on the top, then narrowing 3/4 of the way down the side walls, at this point the filter is bonded to form a closed valley at the bottom, the excess is removed, since the filter

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is being crimped from a conical funnel shape, the bottom is a blunt straight edge that is fused together to block liquid flow though it, the liquid flows through the side walls into the basket to the narrowed centre area of the basket, providing deeper concentration of coffee saturation. There are other designs of funnels which the present invention can be utilized for the general showing of fig (2) should allow those skilled in the art to readily appreciate the inventive aspects of the new re-useable filter, and its ease of installation that is virtually the same as that of the common paper filter. Filter material inner face (1) faces upwardly from the filter basket with support rim (3) and flat bottom (4). Fluted outer face (2) faces downwardly toward filter basket. The filter is simply pushed into the filter basket in the direction of association with basket and filter common geometry. In order to generally assume the same cup shape configuration of the filter basket. The side wall fluted dimensions will contract or expand, and will appear as larger folds or smaller folds, depending on the basket. The filter construction may be categorized as self-folding, and non-collapsing. After one of the above, two described filter embodiments, has been used for making a pot of coffee, it may be removed from the filter basket for disposing of the coffee grounds, thereafter the filter may be washed, or otherwise cleaned for subsequent re-use at the next occasion of brewing. The brewing filter of the present invention facilitates such re-use for extended periods of time, without physical deterioration, and or, without adversely affecting the quality of taste, of the coffee. While the embodiments of the filter which has been disclosed above, may be varied as deemed necessary, or appropriate, to accomodate particular filter applications, for example, smaller sized filters, it may be desirable to change quantity and size of flutes. But for use in typical coffeemakers, the present invention designs are sufficient. Obviously, modifications and alternations will occur to others upon reading and understanding of the specification, it is my intention to include all such modifications, and alterations, insofar as they come within the scope of the appended claims, or the equivalents thereof.

CLAIMS

1. A re-useable coffee brewing filter for drip type coffeemakers, which is generally a fluted frustum conical shape, wherein the present invention has no support skeleton affixed to any face of said filter material, for giving support thereto, but has a fused outer peripheral edge which aids in support, and is of the same chemical composition. Said fused outer rim is part of the filter shape, and runs down the side walls which are tapered, fluted walls, ending on a flat bottom, which is the centrally located part of the filter that is circular and flat. And is a generally fluted cup-shaped configuration, therefor when said filter is inserted into said filter support; the said fluted side walls extending from the bottom of said filter press outwardly to the inside walls of said support structure, they compress or expand depending on the size ratio of said filter to support structure inside walls.
2. A brewing filter, or liquid filter comprising a polyethelene terephthalate monofilament fibre, of a high density, with a specific gravity of 1.14 to 1.38, with a maximum operating temperature of approximately 300dg f, with a high resistance to chemical attack, a transition temp of 70 to 80dgC. and a moisture regain of .01% - .40% that is weaved, plain, chain, twill, satin, with an interstice of between .0070in to .0098in.
3. The brewing filter fibre defined in claim (2) to be used in the construction of a brewing filter for coffeemakers, that has the ability to be heat set to a fixed shape configuration as described in claim (1). Or any formed, self supporting configuration for use as a brewing filter.
4. The filter as defined in claims (1,2,3,) wherein the fluted-frustum conical or funnel shape, with an outer peripheral edge that is fused to a solid fairly rigid medium of itself, or of a different material, which is an only aid in support of the filter form, that helps retain its' geometric shape after mechanical stresses are exerted against its' moulded geometric form.
5. A permanent re-useable coffee, or tea brewing filter, as defined in claims (1,2,3,4,) having a central portion, and a fluted outer peripheral edge, with no other support skeleton other than what has been described in proceeding claims, and including a plurality of spaced apart interstices, around centre portion and extending outwardly from said central portion, toward said outer peripheral edge. At the outer peripheral edge the fibres are fused to produce a solid non-porous section, which aids in the form support.
6. A permanent re-useable brewing filter, comprising of claims (1 to 5) with three different porosities adapted to filter coffee of different grain sizes, in drip type coffeemakers, with liquid flow through coffee cake to the filter septum area, and through the septum interstices to server container. The filter being that which is defined as the present invention, and not limited to the exact shapes as illustrated in the drawings of the preferred form.

7. a re-useable coffee or tea, brewing filter comprising a polyethelene terephthalate fibre, or a nylon, acrylic, modacrylic, teflon, glass, chemical composition, to be used in the construction of a re-useable coffee brewing filter for drip type coffeemakers..

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FIG. 3

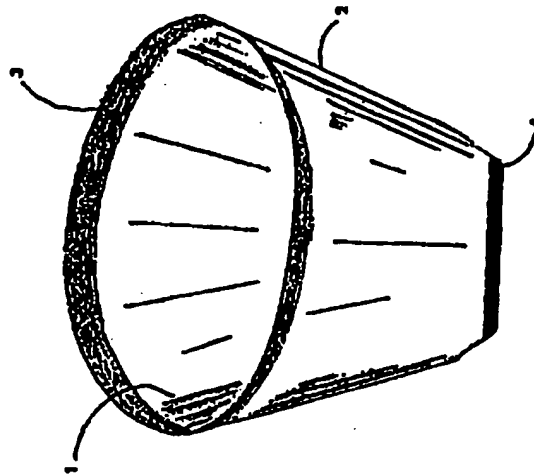


FIG. 1

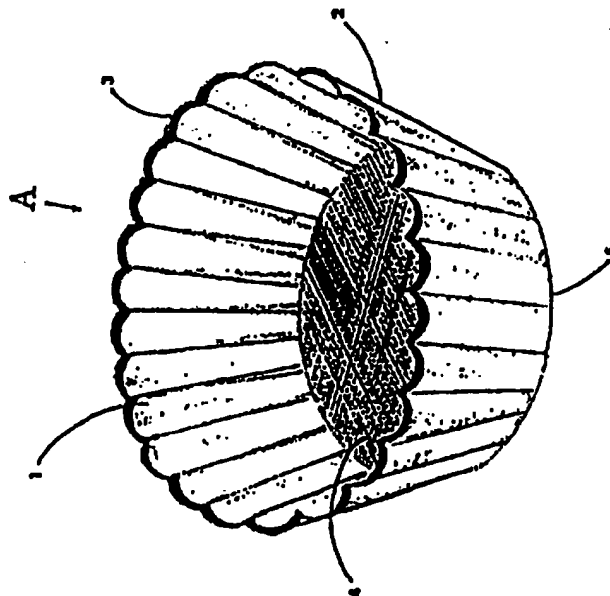
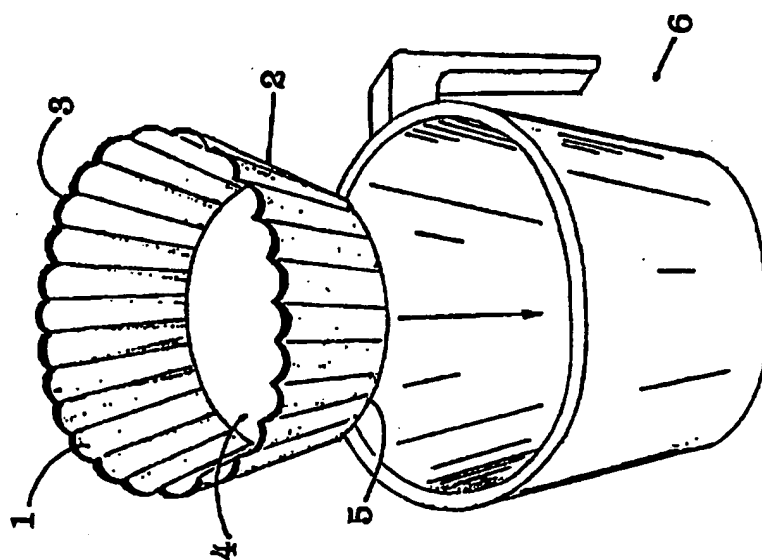


FIG. 2



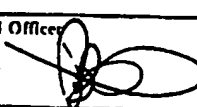
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INTERNATIONAL SEARCH REPORT

International Application No

PCT/CA 91/00065

I. CLASSIFICATION OF SUBJECT MATTER (If several classification symbols apply, indicate all) ⁶		
According to International Patent Classification (IPC) or to both National Classification and IPC Int.Cl. 5 A47J31/08		
II. FIELDS SEARCHED		
Minimum Documentation Searched ⁷		
Classification System	Classification Symbols	
Int.Cl. 5	A47J ; B01D ; B65D	
Documentation Searched other than Minimum Documentation to the Extent that such Documents are Included in the Fields Searched ⁸		
III. DOCUMENTS CONSIDERED TO BE RELEVANT⁹		
Category ^o	Citation of Document, ¹¹ with indication, where appropriate, of the relevant passages ¹²	Relevant to Claim No. ¹³
Y	DE,A,2 314 892 (KOTTE) October 3, 1974 see claims 1,2; figures	1
A	---	3,4
Y	DE,A,3 817 749 (KAP INC) August 17, 1989 see page 1, line 1 - line 25; figure 1	1
A	---	1,3-5
A	GB,A,2 120 951 (KENNETH LONG-SING NG) December 14, 1983 see the whole document	1,3-5
A	---	1,3,4,6
A	FR,A,2 530 446 (MANDAR) January 27, 1984 see page 1, line 21 - page 2, line 11 see page 3, line 3 - page 4, line 8; figures 4,7	1,3,4,6
A	---	1,3

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<div style="display: flex; justify-content: space-between;"> <div style="width: 45%;"> <p>^o Special categories of cited documents: ¹⁰</p> <p>"A" document defining the general state of the art which is not considered to be of particular relevance</p> <p>"E" earlier document but published on or after the international filing date</p> <p>"I" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)</p> <p>"O" document referring to an oral disclosure, use, exhibition or other means</p> <p>"P" document published prior to the international filing date but later than the priority date claimed</p> </div> <div style="width: 45%;"> <p>"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention</p> <p>"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step</p> <p>"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.</p> <p>"A" document member of the same patent family</p> </div> </div>		
IV. CERTIFICATION		
Date of the Actual Completion of the International Search	Date of Mailing of this International Search Report	
05 JUNE 1991	19.07.91	
International Searching Authority	Signature of Authorized Officer	
EUROPEAN PATENT OFFICE	BODART P. 	

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III. DOCUMENTS CONSIDERED TO BE RELEVANT (CONTINUED FROM THE SECOND SHEET)		
Category *	Citation of Document, with indication, where appropriate, of the relevant passages	Relevant to Claim No.
A	US,A,3 250 398 (ADILETTA) May 10, 1966 see the whole document ---	1,3
A	US,A,2 546 874 (SIEGRIST) March 27, 1951 see the whole document ---	1
A	PATENT ABSTRACTS OF JAPAN vol. 14, no. 250 (C-723)(4193) May 29, 1990 & JP-A-2 68 395 (KURARAY CO LTD) March 7, 1990 see the whole document ---	2,7

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**ANNEX TO THE INTERNATIONAL SEARCH REPORT
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CA 9100065
SA 45260

This annex lists the patent family members relating to the patent documents cited in the above-mentioned international search report.
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Patent document cited in search report	Publication date	Patent family member(s)	Publication date
DE-A-2314892	03-10-74	None	
DE-A-3817749	17-08-89	None	
GB-A-2120951	14-12-83	None	
FR-A-2530446	27-01-84	CA-A- 1176109	16-10-84
DE-A-3434687	03-04-86	None	
US-A-3250398		None	
US-A-2546874		None	

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